First Great Western

READING TURBO MAINTENANCE DEPOT

CLASS 165/166 TURBO

POWER OPERATED DOORS

First
165 103

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Section 1

INTRODUCTION.

The Class 165/166 has two types of power operated doors.

a. External plug sliding doors for passenger and crew access.

b. Internal sliding doors to allow movement within the train.

Non-powered sliding doors, of the same type as the internal first class powered doors are fitted in the DMOS. The non-powered doors can be locked in the closed position, so that parcels can be carried in the small compartment. All other doors in the train are hinged and unpowered.

EXTERNAL DOORS.

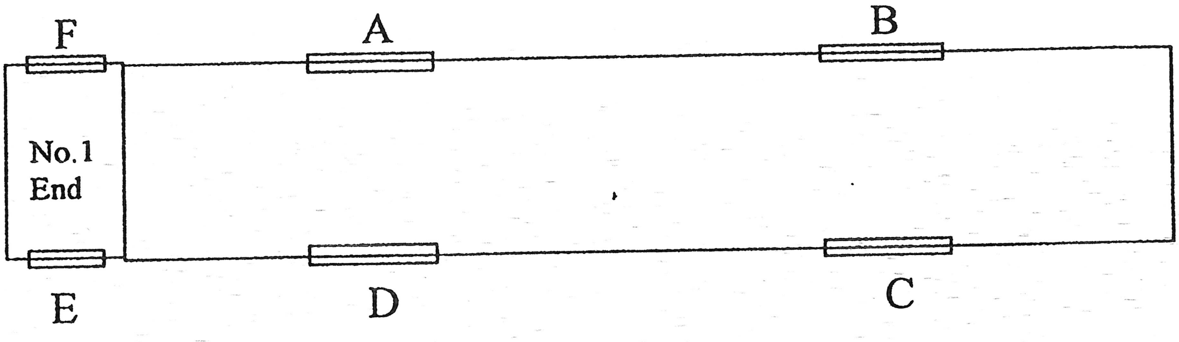
The external sliding plug doors are manufactured by I.F.E. Austria and were designed for the Austrian Railways 1958 stock, so are well proven. The plug design saves space within the interior, at the same time a good outside line is maintained when the doors are closed.

The doors are constructed of an aluminium skin, with an aluminium inner honeycomb type core and are as strong if not stronger than the bodyshell. Neoprene seals around the doors provide draught, weather and noise protection.

The pneumatic controls are manufactured by K.V.Ltd. U.K. and modules for the passenger and crew access doors have been designed to keep control air pipes and the electrical control wiring to a minimum.

There are no control connections attached to the doors, such as air pipes or electrical wiring.

DOOR LOCATIONS.

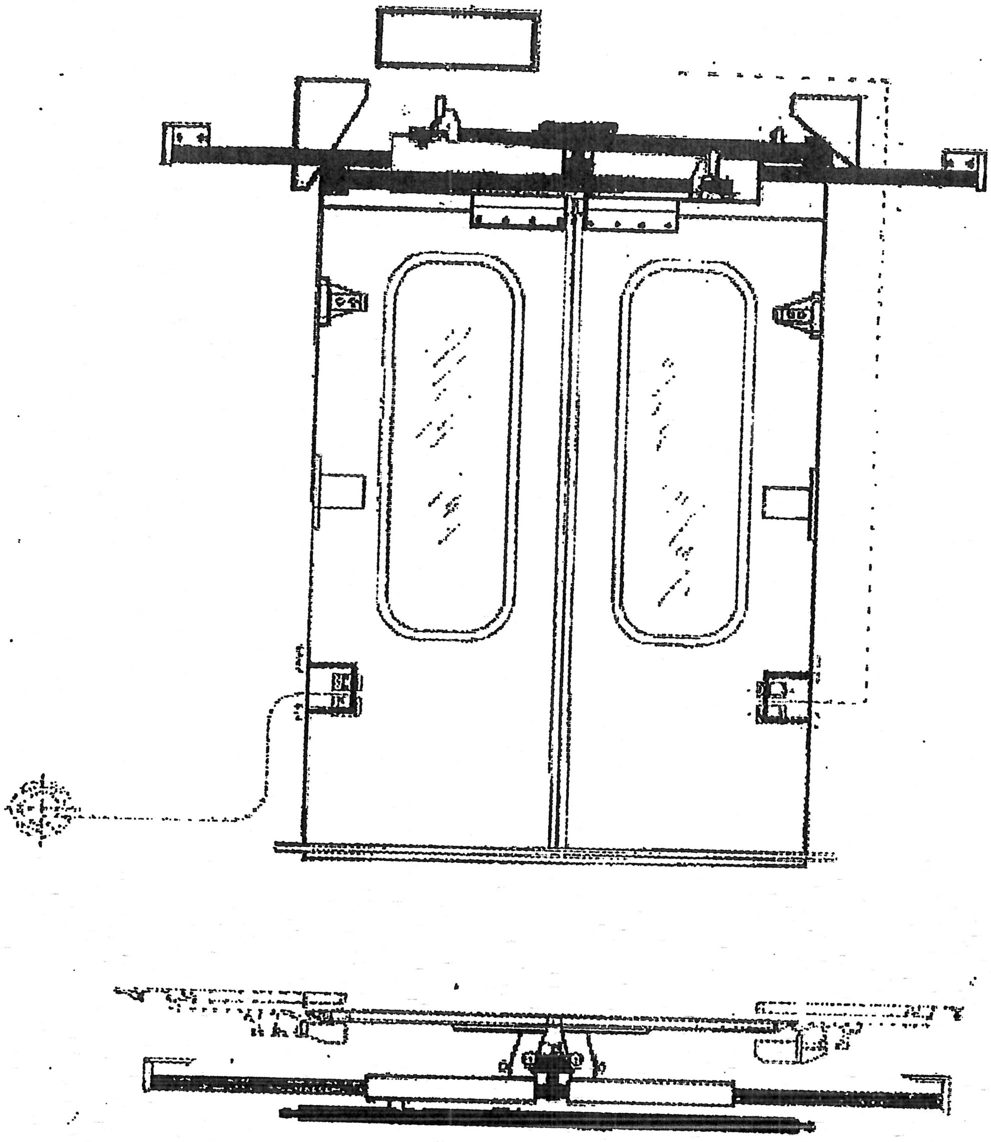


A C DOORS NO EXTERNAL EMERGENCY ACCESS
B D DOORS EXTERNAL EMERGENCY ACCESS FITTED

An MOS. has A to D doors only.

EXTERNAL PASSENGER DOORS.

Passenger doors are bi-parting sliding plug type, and fitted with internal stainless steel kick strips. Most of the door equipment is above the doors, with support parts extending into the passenger saloon at luggage rack height. These parts are covered and are not easily accessible.



Section 2

Locking Mechanisms.

Locking each door is an active and fixed latch unit installed on the door pillar.

Retaining Catches.

Retaining catches are mounted on the doorleaf trailing edges, these catches engage in the door active and fixed latches.

Emergency Egress. (Green Handle with a frangible cover).

The egress device is the internal exit device fitted above and to the left of passenger doorways. If the green handle is pulled downwards both doors are released allowing them to be fully opened manually, with the air system pressurised. Without air in the system, only the RH. door is released.
The Emergency Egress is reset with a BR. square key.

Emergency Access. (Recessed Handle).

The external rotating handles (B and D doors only) fitted at solebar level, are for use at trackside and platform level. By turning the handle clockwise the doors will fully opened when the air system is charged. Without air in the system, only the LH. door releases. The rotary handle needs to be reset to the horizontal position before the doors will close.

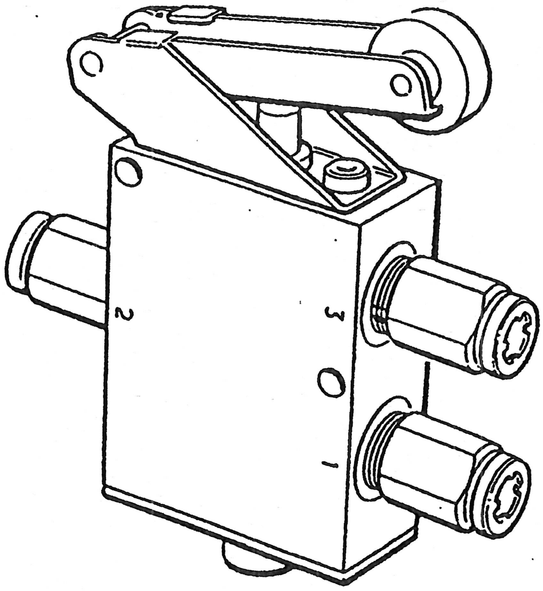
Bowden Cable.

One Bowden Cable is fitted between the internal Emergency Egress and the RH. Active Lock Unit, also between the external Emergency Access and the LH. Active Lock Unit(B and D doors only). When the emergency devices are used without air pressure the doors will release with the aid of the cables.

DOOR AIR CONTROLS.

Air Roller Trip Valve.

The Air Roller Trip Valve is a pneumatic switch operated on the cam principle.



TRIP VALVE

ACTIVE LOCK UNIT.

Each doorleaf has its own active lock unit, fitted at one third level from the floor, which has a fixed and an active latch. The unit also includes interlock switches.

Active Lock (latch).

The active latch part of the Active Lock is a locking and releasing device. As the door comes to a close the retaining catch on the door trailing edge engages into the active latch of the lock unit. As the door then fully closes the retaining catch engages into the latch, moving the latch into the locked positiion. The active latch piston, which is already charged with air, then locks the door pneumatically as well as locking the door mechanically.

To release the active latch, air in the active latch piston is exhausted, and at the same time the release air piston is charged with air. This then allows the actuator to open the door.

Active Lock Interlock Switches.

A positive sensing green micro-switch fitted to the top of the active lock unit senses that the door is closed and locked. This switch has two sets of contacts, normally open and normally closed.

A negative sensing orange doorleaf micro-switch fitted to the bottom of the active lock unit senses the presence of the door. This switch has two sets of contacts, normally open and normally closed.

The normally closed contacts on both the green and the orange switch form part of the interlock circuit.

The brakes can be released with the door interlock circuit broken, but power can only be attained when interlock circuits are complete. If the interlock circuit is broken when the train is moving, traction power is lost, and if the train speed is above 10kph, the brakes will apply.

Note. The interlock circuit is shown on the schematic drawings with all doors closed and locked.

Fixed Latches.

Two fixed latches for each passenger door are installed on the door pillars to engage in retaining catches on the door trailing edges. One latch is part of the active lock unit, the other a seperate latch at one-third level from the top of the door. The latches ensure that the doors do not "pant" when entering a tunnel or passing another train at speed.

PNEUMATIC SUPPLY AND CONTROL.

Air supply.

Power for the passenger doors is supplied from the Local Main Reservoir Pipe (LMRP) via the Door Supply Isolating Cock (DSIC), located on the Transmission (Gearbox) Requlator Unit module.

The crew access doors are fed separately.

Tubing and Connections.

The nylon tubing is connected to the modules and air switches with "Legris" push in connections. Tubing is coloured and labelled for identification and normally will not need to be disconnected. The module port connections are also marked for easy identification.

Special tools should be used to remove tubing from the connection ports on the modules and switches. A set procedure must be followed if tubing disconnection is required, to ensure the tube is cut cleanly and square.

A KV. CUTTING TOOL MUST BE USED.

Tube length and state are very important. Incorrect lengths of tubing will cause reaction times of the pneumatic circuit to alter. The risk of kinks creating more serious problems is also considerably increased when tube length is incorrect.

Tubing can be supplied as a kit or in lengths, and must be stored in a sealed bag, to prevent the ingress of dirt and moisture.

Air Supply (Passenger Doors).

Air for the external doors and controls must be dry, unlubricated and filtered to 5 microns. The internal doors are fed separately.

From the DSIC., air is fed to all the internal and external passenger doors. A and D doors being fed as one unit, B and C as the other.

The two pairs of doors have a Non-return Valve, a 10 litre Tank and a Filter Regulator Unit with test point. A Sequeance Valve is also fitted to ensure low air pressure does not enter the control circuits.

When dirty or wet air enters the door air system, the door air filters must be checked.

CONTROL MODULE.

The Control Module is made up of layers of aluminium to form a compact block. EP. valves, and valves for the open, close and obstacle detection functions are mounted on the block. The module is manufactured with very small air ways (0.35mm dia) milled into the layers. With the small air ways and the valves all being on the same block, response times to command signals are at a very minimum. Also the amount of nylon tubing is kept to a minimum. The door open timing, close timing, the obstruction detection time delay settings, and the obstacle detection forces are factory preset.

ELECTRICAL SUPPLY.

The electrical supply is from the Start Battery and therefore the doors still function when the Auxialary Battery is out on low volts.

Door Control Circuit Breaker (CB-D) for through train door control.

Door Supply Circuit Breaker (CB-DS) supplying the module EP. valves, pushbutton supply and pushbutton lighting.

DOOR ELECTRICAL CONTROLS.

Passenger Door Controls in Drivers Cab.

Passenger door RELEASE and CLOSE pushbuttons are positioned in the cab for drivers use only, and are in circuit when the direction switch (S-DI) is away from the "OFF" position.

Passengers Controls.

OPEN and CLOSE pushbutton units incorporating "OUT OF ORDER" signs are fitted internally on door pillars.

An external open pushbutton, known as a "PRESSEL" is fitted on the door trailing edge. Pressing a "PRESSEL" will act on an inductive sensor switch mounted on the door pillar. The sensor switch will only line up with the "PRESSEL" when the doors are closed.

Crew Control (Station Staff).

CLOSE pushbuttons, one button for each side, are fitted outside at No.2 end. They are for use by platform staff and train crew, and doors are disabled on the side of that vehicle only when pressed.

Automatic Close Unit.

The Auto-close system, a transmitter and receiver unit. The doors will automatically close if passengers do not enter or exit a set of doors (break a beam) within a set time between 20-120secs. The unit can be isolated with a BR. square key.

Other Electrical Controls.

Relays and timed relays ensure the doors only operate when required. Relays and micro-switches ensure interlocking for traction and brake control. Relays are also used to short circuit the door interlock switches when the doors are isolated.

Cantrail Lights.

Orange lights are fitted on the outside, centre of the vehicle at cantrail level. They are lit when the door interlock circuit is broken and also when certain faults occur on the vehicle.

Door Interlock Lights.

Lights indicate to the driver when the doors are closed and the interlock circuits complete. When the BLUE interlock light is lit and the RED light out, interlock switches and circuits are unbroken.

Warning devices and associated lighting complete the door circuits.